L 12

```
   SSSSSSSSSSSS   YYY         YYY     SSSSSSSSSSSS
   SSSSSSSSSSSS   YYY         YYY     SSSSSSSSSSSS
   SSSSSSSSSSSS   YYY         YYY     SSSSSSSSSSSS
SSS               YYY         YYY  SSS
SSS               YYY         YYY  SSS
SSS               YYY         YYY  SSS
SSS                  YYY   YYY     SSS
SSS                  YYY   YYY     SSS
SSS                  YYY   YYY     SSS
   SSSSSSSSS            YYY           SSSSSSSSS
   SSSSSSSSS            YYY           SSSSSSSSS
   SSSSSSSSS            YYY           SSSSSSSSS
            SSS         YYY                    SSS
            SSS         YYY                    SSS
            SSS         YYY                    SSS
            SSS         YYY                    SSS
            SSS         YYY                    SSS
            SSS         YYY                    SSS
SSSSSSSSSSSS            YYY        SSSSSSSSSSSS
SSSSSSSSSSSS            YYY        SSSSSSSSSSSS
SSSSSSSSSSSS            YYY        SSSSSSSSSSSS
```

```
_$

Ps
--

YZ

Z$

Z$

Z$


Z$


Z$




Z$

Z$

Z$

Z$

Z$

Z$


Z$
```

```
                                                                      F  5
**FILE**ID**SYSCVRTIM





  SSSSSSSS  YY      YY    SSSSSSSS    CCCCCCCC  VV      VV  RRRRRRRR    TTTTTTTTTT    IIIIII    MM      MM
  SSSSSSSS  YY      YY    SSSSSSSS    CCCCCCCC  VV      VV  RRRRRRRR    TTTTTTTTTT    IIIIII    MM      MM
SS          YY      YY  SS           CC         VV      VV  RR      RR      TT          II      MMMM  MMMM
SS          YY      YY  SS           CC         VV      VV  RR      RR      TT          II      MMMM  MMMM
SS            YY  YY    SS           CC         VV      VV  RR      RR      TT          II      MM  MM  MM
SS            YY  YY    SS           CC         VV      VV  RR      RR      TT          II      MM  MM  MM
  SSSSSS        YY        SSSSSS     CC         VV      VV  RRRRRRRR        TT          II      MM      MM
  SSSSSS        YY        SSSSSS     CC         VV      VV  RRRRRRRR        TT          II      MM      MM
        SS      YY              SS   CC         VV      VV  RR  RR          TT          II      MM      MM
        SS      YY              SS   CC         VV      VV  RR  RR          TT          II      MM      MM
        SS      YY              SS   CC           VV  VV    RR    RR        TT          II      MM      MM      ....
        SS      YY              SS   CC           VV  VV    RR    RR        TT          II      MM      MM      ....
SSSSSSSS        YY      SSSSSSSS      CCCCCCCC      VV      RR      RR      TT        IIIIII    MM      MM      ....
SSSSSSSS        YY      SSSSSSSS      CCCCCCCC      VV      RR      RR      TT        IIIIII    MM      MM      ....

LL            IIIIII      SSSSSSSS
LL            IIIIII      SSSSSSSS
LL              II      SS
LL              II      SS
LL              II      SS
LL              II      SS
LL              II        SSSSSS
LL              II        SSSSSS
LL              II              SS
LL              II              SS
LL              II              SS
LL              II              SS
LLLLLLLLLL    IIIIII    SSSSSSSS
LLLLLLLLLL    IIIIII    SSSSSSSS
```

Table of contents

```
0000          .TITLE  SYSCVRTIM - SYSTEM SERVICES TO CONVERT TIME
0000          .IDENT  'V04-000'
0000
0000    ;
0000    ;****************************************************************************
0000    ;*                                                                          *
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0000    ;*                                                                          *
0000    ;*                                                                          *
0000    ;****************************************************************************
0000    ;
0000    ; D. N. CUTLER 6-JAN-76
0000    ;
0000    ; SYSTEM SERVICES TO CONVERT TIME
0000    ;
0000    ;       CONVERT BINARY TIME TO ASCII STRING
0000    ;       CONVERT ASCII STRING TO BINARY TIME
0000    ;       CONVERT BINARY TIME TO NUMERIC FORMAT
0000    ;
0000    ;       THE CONVERSION ALGORITHMS USED HEREIN WERE DEVELOPED BY P. CONKLIN,
0000    ;       M. SPIER, AND D. ROSENBERY ON THE PDP-10.
0000    ;
0000    ; MODIFIED BY:
0000    ;
0000    ;       V03-001 KDM0086         Kathleen D. Morse       02-Apr-1982
0000    ;               Correctly acquire system time, even in case where
0000    ;               secondary processor is accessing EXE$GQ_SYSTIME while
0000    ;               the primary processor is updating it (11/782 case).
0000    ;
0000    ;       V02-004 ROW37307        Ralph O. Weber          27-Jul-1981
0000    ;               Fix EXE$BINTIM to treat decimal point preceeding hundredths of
0000    ;               a second field as a true decimal point.  IE: to cause 0:0:0.1
0000    ;               to convert to 1 tenth of a second rather than to 1 hundredth
0000    ;               of a second.  Also allow indefinite length fractional value
0000    ;               fields.  Use the thousandths digit to round the hundredths
0000    ;               value, and ignore all digits following the thousandths digit.
0000    ;               The entire field, upto the first trailing blank, is still
0000    ;               processed.  Therefore, non-numeric characters in the
0000    ;               fractional seconds field will still produce an Invalid Time
0000    ;               return code.
0000    ;
```

```
            0000  ;       V02-003 TCM0001         Trudy C. Matthews       03-Jun-1981
            0000  ;               Fix CONVERT subroutine in EXE$BINTIM to ignore blanks.  This
            0000  ;               fix allows trailing blanks after a truncated time field.
            0000  ;
            0000  ;
            0000  ;
            0000  ; MACRO LIBRARY CALLS
            0000  ;
            0000
            0000          $SSDEF                                  ;DEFINE SYSTEM STATUS VALUES
            0000
            0000  ;
            0000  ; LOCAL SYMBOLS
            0000  ;
            0000  ; ARGUMENT LIST OFFSET DEFINTIONS FOR CONVERT BINARY TIME TO ASCII STRING
            0000  ;
            0000
00000004    0000  ATIMLEN=4                                       ;ADDRESS OF WORD TO STORE LENGTH
00000008    0000  ATIMBUF=8                                       ;ADDRESS OF OUTPUT BUFFER DESCRIPTOR
0000000C    0000  ATIMADR=12                                      ;ADDRESS OF 64-BIT ABSOLUTE OR DELTA TIME
00000010    0000  ACVTFLG=16                                      ;CONVERSION INDICATOR
            0000
            0000  ;
            0000  ; ARGUMENT LIST OFFSET DEFINITIONS FOR CONVERT ASCII STRING TO BINARY TIME
            0000  ;
            0000
00000004    0000  BTIMBUF=4                                       ;ADDRESS OF ASCII STRING DESCRIPTOR
00000008    0000  BTIMADR=8                                       ;ADDRESS TO STORE 64-BIT ABSOLUTE OR DELTA T
            0000
            0000  ;
            0000  ; ARGUMENT LIST OFFSET DEFINITIONS FOR CONVERT BINARY TIME TO NUMERIC TIME
            0000  ;
            0000
00000004    0000  NTIMBUF=4                                       ;ADDRESS OF 7-WORD BUFFER TO RECEIVE TIME
00000008    0000  NTIMADR=8                                       ;ADDRESS OF 64-BIT ABSOLUTE OR DELTA TIME
            0000
            0000  ;
            0000  ; CONVERSION CONSTANTS
            0000  ;
            0000  ; TOTAL DAYS IN A CENTURY
            0000  ;
            0000
00008EAC    0000  CENTURYDAYS=<100*365>+<100/4>-<100/100> ;
            0000
            0000  ;
            0000  ; AVERAGE QUARTER DAYS PER CENTURY
            0000  ;
            0000
00023AB1    0000  QDAYSPCENT=<<<100*365>+<100/4>-<100/100>>*4>+<400/400> ;
            0000
            0000  ;
            0000  ; AVERAGE QUARTER DAYS PER YEAR
            0000  ;
            0000
000005B5    0000  QDAYSPYEAR=<365*4>+1                ;
            0000
            0000  ;
```

```
                  0000   ; TOTAL DAYS IN A QUADRICENTURY
                  0000   ;
                  0000
        00023AB1  0000   QUADRIDAYS=<400*365>+<400/4>-<400/100>+<400/400> ;
                  0000
                  0000   ;
                  0000   ; TOTAL DAYS IN A QUADYEAR
                  0000   ;
                  0000
        000005B5  0000   QUADYEARDAYS=<365*4>+1                        ;
                  0000
                  0000   ;
                  0000   ; OFFSET IN DAYS FROM 1-JAN-1501 TO 17-NOV-1858
                  0000   ;
                  0000
        0001FE98  0000   TIMOFF1=<<1858-1501>*365>+<<1858-1501>/4>-<<1858-1501>/100>+<<1858-1501>/400>+ -;
                  0000           31+28+31+30+31+30+31+31+30+31+17 ;
                  0000
                  0000   ;
                  0000   ; OFFSET IN DAYS FROM 1-JAN-1601 TO 17-NOV-1858
                  0000   ;
                  0000
                  0000   TIMOFF2=<<1858-1601>*365>+<<1858-1601>/4>-<<1858-1601>/100>+<<1858-1601>/400>+ -;
        00016FEC  0000           31+28+31+30+31+30+31+31+30+31+17 ;
                  0000
                  0000   ;
                  0000   ; CHARACTER CODE DEFINITIONS
                  0000   ;
                  0000
        00000020  0000   BLANK=32                                      ;
        0000003A  0000   COLON=58                                      ;
        0000002D  0000   HYPHEN=45                                     ;
        00000039  0000   NINE=57                                       ;
        00000030  0000   ONE=48                                        ;
        0000002E  0000   PERIOD=46                                     ;
                  0000
                  0000   ;
                  0000   ; NUMERIC TIME BUFFER OFFSET DEFINITIONS
                  0000   ;
                  0000
        00000000  0000   YEAR=0                                        ;
        00000002  0000   MONTH=2                                       ;
        00000004  0000   DAY=4                                         ;
        00000006  0000   HOUR=6                                        ;
        00000008  0000   MINUTE=8                                      ;
        0000000A  0000   SECOND=10                                     ;
        0000000C  0000   HUNDREDTH=12                                  ;
                  0000
                  0000   ;
                  0000   ; LOCAL DATA
                  0000   ;
                  0000   ; MONTH, DAY CONVERSION TABLE
                  0000   ;
              00000000           .PSECT  Y$EXEPAGED
                  0000   DATETABLE:                                    ;DATE CONVERSION TABLE
              1F  0000           .BYTE   31                            ;JANUARY
              1D  0001           .BYTE   29                            ;FEBRUARY
```

```
                                   1F  0002          .BYTE   31                       ;MARCH
                                   1E  0003          .BYTE   30                       ;APRIL
                                   1F  0004          .BYTE   31                       ;MAY
                                   1E  0005          .BYTE   30                       ;JUNE
                                   1F  0006          .BYTE   31                       ;JULY
                                   1F  0007          .BYTE   31                       ;AUGUST
                                   1E  0008          .BYTE   30                       ;SEPTEMBER
                                   1F  0009          .BYTE   31                       ;OCTOBER
                                   1E  000A          .BYTE   30                       ;NOVEMBER
                                   1F  000B          .BYTE   31                       ;DECEMBER
                                       000C
                                       000C  ;
                                       000C  ; MONTH CONVERSION TABLE
                                       000C  ;
                                       000C
                                       000C  MONTHTAB:
                          4E 41 4A 03  000C          .ASCII  <3>/JAN/                 ;
                          42 45 46 03  0010          .ASCII  <3>/FEB/                 ;
                          52 41 4D 03  0014          .ASCII  <3>/MAR/                 ;
                          52 50 41 03  0018          .ASCII  <3>/APR/                 ;
                          59 41 4D 03  001C          .ASCII  <3>/MAY/                 ;
                          4E 55 4A 03  0020          .ASCII  <3>/JUN/                 ;
                          4C 55 4A 03  0024          .ASCII  <3>/JUL/                 ;
                          47 55 41 03  0028          .ASCII  <3>/AUG/                 ;
                          50 45 53 03  002C          .ASCII  <3>/SEP/                 ;
                          54 43 4F 03  0030          .ASCII  <3>/OCT/                 ;
                          56 4F 4E 03  0034          .ASCII  <3>/NOV/                 ;
                          43 45 44 03  0038          .ASCII  <3>/DEC/                 ;
                                       003C
                                       003C  ;
                                       003C  ; HOURS, MINUTES, SECONDS, HUNDREDTHS CONVERSION TABLE
                                       003C  ;
                                       003C
                                       003C  TIMETABLE:                               ;TIME CONVERSION TABLE
                                   64  003C          .BYTE   100                      ;HUNDREDTHS
                                   3C  003D          .BYTE   60                       ;SECONDS
                                   3C  003E          .BYTE   60                       ;MINUTES AND HOURS
                                       003F
                                       003F  ;
                                       003F  ; CONVERSION CONTROL STRINGS
                                       003F  ;
                                       003F
5A 34 21 2D 43 41 21 2D 57 53 32 21  003F  DATE:   .ASCII  /!2SW-!AC-!4ZW /         ;
                                20 57  004B
                       20 57 53 34 21  004D  DELTA:  .ASCII  /!4SW /                  ;
32 21 3A 57 5A 32 21 3A 57 5A 32 21  0052  TIME:   .ASCII  /!2ZW:!2ZW:!2ZW.!2ZW/    ;
               57 5A 32 21 2E 57 5A  005E
```

```
                      0065          .SBTTL  CONVERT BINARY TIME TO ASCII STRING
                      0065  ;+
                      0065  ; EXE$ASCTIM - CONVERT BINARY TIME TO ASCII STRING
                      0065  ;
                      0065  ; THIS SERVICE PROVIDES THE CAPABILITY TO CONVERT AN ABSOLUTE OR DELTA
                      0065  ; TIME FROM 64-BIT FORMAT TO AN ASCII STRING.
                      0065  ;
                      0065  ; INPUTS:
                      0065  ;
                      0065  ;       ATIMLEN(AP) = ADDRESS OF WORD TO RECEIVE OUTPUT LENGTH.
                      0065  ;       ATIMBUF(AP) = ADDRESS OF OUTPUT BUFFER DESCRIPTOR.
                      0065  ;       ATIMADR(AP) = ADDRESS OF 64-BIT TIME VALUE. IF ZERO, THEN THE CURRENT
                      0065  ;               SYSTEM TIME IS USED. POSITIVE VALUES ARE INTERPRETED AS
                      0065  ;               ABSOLUTE TIMES AND NEGATIVE VALUES AS DELTA TIMES.
                      0065  ;       ACVTFLG(AP) = CONVERSION INDICATOR.
                      0065  ;               LOW BIT CLEAR INDICATES BOTH DATE AND TIME ARE TO BE CON-
                      0065  ;                       VERTED.
                      0065  ;               LOW BIT SET INDICATES ONLY TIME IS TO BE CONVERTED.
                      0065  ;
                      0065  ; OUTPUTS:
                      0065  ;
                      0065  ;       R0 LOW BIT CLEAR INDICATES FAILURE TO CONVERT TIME TO ASCII.
                      0065  ;
                      0065  ;               R0 = SS$_ACCVIO - 64-BIT TIME VALUE OR OUTPUT BUFFER DESCRIPTOR
                      0065  ;                       CANNOT BE READ BY CALLING ACCESS MODE, OR OUTPUT BUFFER
                      0065  ;                       CANNOT BE WRITTEN BY CALLING ACCESS MODE.
                      0065  ;
                      0065  ;               R0 = SS$_IVTIME - SPECIFIED DELTA TIME IS GREATER THAN 9999
                      0065  ;                       DAYS.
                      0065  ;
                      0065  ;       R0 LOW BIT SET INDICATES SUCCESSFUL COMPLETION.
                      0065  ;
                      0065  ;               R0 = SS$_NORMAL - NORMAL COMPLETION.
                      0065  ;-
                      0065
                      0065  EXE$ASCTIM::                                    ;CONVERT TIME TO ASCII
               007C   0065          .WORD   ^M<R2,R3,R4,R5,R6>              ;ENTRY MASK
7E    08 BC      7D   0067          MOVQ    @ATIMBUF(AP),-(SP)              ;SAVE OUTPUT BUFFER DESCRIPTOR
   56    5E      D0   006B          MOVL    SP,R6                           ;SAVE ADDRESS OF OUTPUT BUFFER DESCRIPTOR
         7E      D4   006E          CLRL    -(SP)                           ;CLEAR SPACE FOR LENGTH FROM FAO
   55    5E      D0   0070          MOVL    SP,R5                           ;SAVE ADDRESS OF LENGTH
         52      D4   0073          CLRL    R2                              ;ASSUME ABSOLUTE TIME SPECIFIED
53    0C AC      D0   0075          MOVL    ATIMADR(AP),R3                  ;GET ADDRESS OF 64-BIT TIME VALUE
         07      13   0079          BEQL    10$                             ;IF EQL NONE SPECIFIED
   50    63      7D   007B          MOVQ    (R3),R0                         ;GET 64-BIT TIME VALUE
         02      18   007E          BGEQ    10$                             ;IF GEQ ABSOLUTE TIME
         52      D6   0080          INCL    R2                              ;INDICATE DELTA TIME
   5E    10      C2   0082  10$:    SUBL    #<<<7*2>+3>/4>*4,SP             ;ALLOCATE NUMERIC TIME BUFFER
   54    5E      D0   0085          MOVL    SP,R4                           ;SAVE ADDRESS OF NUMERIC TIME BUFFER
                      0088          $NUMTIM_S (R4),(R3)                     ;CONVERT TIME TO NUMERIC FORMAT
     6F 50       E9   0093          BLBC    R0,60$                          ;IF LBC CONVERSION FAILURE
                      0096
                      0096  ;
                      0096  ; CONVERT TIME TO ASCII FORMAT
                      0096  ;
                      0096
  3E 10 AC       E8   0096          BLBS    ACVTFLG(AP),40$                 ;IF LBS ONLY TIME IS TO BE CONVERTED
```

```
          12 52    E8  009A            BLBS    R2,20$                          ;IF LBS DELTA TIME SPECIFIED
                       009D
                       009D      ;
                       009D      ; CONVERT DATE
                       009D      ;
                       009D
    52     02 A4   3C  009D            MOVZWL  MONTH(R4),R2                    ;GET NUMERIC MONTH VALUE
52    FF62 CF42    DE  00A1            MOVAL   W^MONTHTAB-4[R2],R2             ;GET ADDRESS OF MONTH COUNTED STRING
         FF94 CF   DF  00A7            PUSHAL  W^DATE                          ;BUILD DESCRIPTOR FOR CONTROL STRING
              0E   DD  00AB            PUSHL   #DELTA-DATE                     ;
              06   11  00AD            BRB     30$                             ;
                       00AF
                       00AF      ;
                       00AF      ; CONVERT DELTA TIME
                       00AF      ;
                       00AF
         FF9A CF   DF  00AF      20$:  PUSHAL  W^DELTA                         ;BUILD CONTROL STRING DESCRIPTOR
              05   DD  00B3            PUSHL   #TIME-DELTA                     ;
         51   5E   D0  00B5      30$:  MOVL    SP,R1                           ;COPY ADDRESS OF CONTROL STRING DESCRIPTOR
                       00B8            $FAO_S  (R1),(R5),(R6),DAY(R4),R2,YEAR(R4) ;CONVERT DELTA TIME OR DATE
           36 50   E9  00CC            BLBC    R0,60$                          ;IF LBC CONVERT FAILURE
         66   65   A2  00CF            SUBW    (R5),(R6)                       ;ANY SPACE LEFT IN TIME BUFFER?
              27   15  00D2            BLEQ    50$                             ;IF LEQ NO
      04 A6   65   C0  00D4            ADDL    (R5),4(R6)                      ;UPDATE TIME BUFFER ADDRESS
                       00D8
                       00D8      ;
                       00D8      ; CONVERT TIME
                       00D8      ;
                       00D8
         FF76 CF   DF  00D8      40$:  PUSHAL  W^TIME                          ;BUILD CONTROL STRING DESCRIPTOR
              13   DD  00DC            PUSHL   #EXE$ASCTIM-TIME                ;
         51   5E   D0  00DE            MOVL    SP,R1                           ;COPY ADDRESS OF CONTROL STRING DESCRIPTOR
                       00E1            $FAO_S  (R1),2(R5),(R6),HOUR(R4),MINUTE(R4),SECOND(R4),HUNDREDTH(R4) ;
    51     04 AC   D0  00FB      50$:  MOVL    ATIMLEN(AP),R1                  ;LENGTH ADDRESS SPECIFIED?
              04   13  00FF            BEQL    60$                             ;IF EQL NO
  61   65   85     A1  0101            ADDW3   (R5)+,(R5),(R1)                 ;COMPUTE AND RETURN OUTPUT LENGTH
                   04  0105      60$:  RET                                     ;
```

```
                              0106          .SBTTL  CONVERT ASCII STRING TO BINARY TIME
                              0106  ;+
                              0106  ; EXE$BINTIM - CONVERT ASCII STRING TO BINARY TIME
                              0106  ;
                              0106  ; THIS SERVICE PROVIDES THE CAPABILITY TO CONVERT AN ASCII STRING TO A
                              0106  ; 64-BIT ABSOLUTE OR DELTA TIME.
                              0106  ;
                              0106  ; INPUTS:
                              0106  ;
                              0106  ;       BTIMBUF(AP) = ADDRESS OF ASCII STRING DESCRIPTOR.
                              0106  ;       BTIMADR(AP) = ADDRESS TO STORE 64-BIT TIME VALUE.
                              0106  ;
                              0106  ; OUTPUTS:
                              0106  ;
                              0106  ;       R0 LOW BIT CLEAR INDICATES FAILURE TO CONVERT TIME TO ASCII.
                              0106  ;
                              0106  ;               R0 = SS$_IVTIME - ASCII STRING HAS INVALID SYNTAX OR TIME
                              0106  ;                       COMPONENT IS OUT OF RANGE.
                              0106  ;
                              0106  ;       R0 LOW BIT SET INDICATES SUCCESSFUL COMPLETION.
                              0106  ;
                              0106  ;               R0 = SS$_NORMAL - NORMAL COMPLETION.
                              0106  ;-
                              0106
                              0106  EXE$BINTIM::                            ;CONVERT ASCII STRING TO BINARY TIME
                        01FC  0106          .WORD   ^M<R2,R3,R4,R5,R6,R7,R8> ;ENTRY MASK
               5E    10   C2  0108          SUBL    #<<<7*2>+3>/4>*4,SP     ;ALLOCATE NUMERIC TIME BUFFER
               57    5E   D0  010B          MOVL    SP,R7                   ;SAVE ADDRESS OF NUMERIC TIME BUFFER
          55        04 BC   7D  010E          MOVQ    @BTIMBUF(AP),R5         ;GET ADDRESS AND LENGTH OF ASCII STRING
                     58   D4  0112          CLRL    R8                      ;ASSUME DELTA TIME
                     55   B7  0114  10$:    DECW    R5                      ;ANY MORE CHARACTERS?
                     64   19  0116          BLSS    30$                     ;IF LSS NO
               86    20   91  0118          CMPB    #BLANK,(R6)+            ;SKIP LEADING BLANK?
                     F7   13  011B          BEQL    10$                     ;IF EQL YES
                     55   B6  011D          INCW    R5                      ;CORRECT NUMBER OF CHARACTERS
          76   55    2D   3A  011F          LOCC    #HYPHEN,R5,-(R6)        ;ABSOLUTE TIME FORMAT?
                     57   13  0123          BEQL    30$                     ;IF EQL NO
                     58   D6  0125          INCL    R8                      ;INDICATE ABSOLUTE TIME
                              0127          $NUMTIM_S (R7)                  ;CONVERT CURRENT TIME TO NUMERIC FORMAT
                              0132
                              0132  ;
                              0132  ; CONVERT ABSOLUTE TIME
                              0132  ;
                              0132
          54        04 A7   DE  0132          MOVAL   DAY(R7),R4              ;SET ADDRESS TO STORE DAY
                   00B1   30  0136          BSBW    CONVERT                 ;CONVERT DAY FIELD
                     2D       0139          .BYTE   HYPHEN                  ;EXPECTED TERMINATOR
                     55   B5  013A          TSTW    R5                      ;ANY MORE CHARACTERS?
                     03   12  013C          BNEQ    11$                     ;BRNCH IF THERE ARE MORE CHARACTERS.
                   00DB   31  013E          BRW     CVRTIME                 ;IF NO MORE CHARACTERS, CONVERT TIME.
               86    2D   91  0141  11$:    CMPB    #HYPHEN,(R6)+           ;MONTH FIELD VOID?
                     2F   13  0144          BEQL    20$                     ;IF EQL YES
FEBF CF   30   76    03   39  0146          MATCHC  #3,-(R6),#4*12,W^MONTHTAB ;SEARCH FOR MONTH SUBSTRING MATCH
                     03   13  014D          BEQL    14$                     ;SKIP ERROR BRANCH IF MATCH FOUND
                   0092   31  014F          BRW     IVTIME                  ;IF NEQ NO MATCH FOUND
          52   30    52   C3  0152  14$:    SUBL3   R2,#4*12,R2             ;CALCULATE CHARACTERS TO START OF SUBSTRING
               52    03   D3  0156          BITL    #3,R2                   ;MULTIPLE OF 4?
```

```
                 03   13  0159          BEQL    16$                ;BRANCH IF MULTIPLE OF 4
               0086   31  015B          BRW     IVTIME             ;IF NOT MULTIPLE OF 4, THEN ERROR
   02 A7     52  04   A7  015E  16$:    DIVW3   #4,R2,MONTH(R7)    ;CONVERT TO MONTH AND STORE
             56  03   C0  0163          ADDL    #3,R6              ;UPDATE ADDRESS OF ASCII STRING
             55  03   A2  0166          SUBW    #3,R5              ;UPDATE COUNT OF REMAINING CHARACTERS
                 79   19  0169          BLSS    IVTIME             ;IF LSS INVALID SYNTAX
                 03   14  016B          BGTR    18$                ;IF GTR CHARACTERS REMAINING
               00AC   31  016D          BRW     CVRTIME            ;OTHERWISE END OF STRING
             86  2D   91  0170  18$:    CMPB    #HYPHEN,(R6)+      ;FIELD TERMINATED PROPERLY?
                 6F   12  0173          BNEQ    IVTIME             ;IF NEQ NO
                 55   B7  0175  20$:    DECW    R5                 ;DECREMENT COUNT OF REMAINING CHARACTERS
             54  67   DE  0177          MOVAL   YEAR(R7),R4        ;SET ADDRESS TO STORE YEAR
                 0A   11  017A          BRB     40$                ;
                          017C
                          017C      ;
                          017C      ; CONVERT DELTA TIME
                          017C      ;
                          017C
             54  67   DE  017C  30$:    MOVAL   YEAR(R7),R4        ;GET ADDRESS TO STORE YEAR
                 84   D4  017F          CLRL    (R4)+              ;CLEAR YEAR AND MONTH
                 64   7C  0181          CLRQ    (R4)               ;CLEAR DAY, HOUR, MINUTE, AND SECOND
              0C A7   B4  0183          CLRW    HUNDREDTH(R7)      ;CLEAR HUNDREDTH
                 62   10  0186  40$:    BSBB    CONVERT            ;CONVERT RELATIVE DAY OR YEAR FIELD
                      20  0188          .BYTE   BLANK              ;EXPECTED TERMINATOR
                 55   B7  0189  50$:    DECW    R5                 ;ANY REMAINING CHARACTERS?
                 03   18  018B          BGEQ    53$                ;BRANCH IF CHARACTERS REMAINING
               008C   31  018D          BRW     CVRTIME            ;ELSE GO PROCESS WHAT WE'VE GOT
             86  20   91  0190  53$:    CMPB    #BLANK,(R6)+       ;NEXT CHARACTER BLANK?
                 F4   13  0193          BEQL    50$                ;IF EQL YES
                 56   D7  0195          DECL    R6                 ;BACK UP TO NONBLANK CHARACTER
                 55   D6  0197          INCL    R5                 ;ADJUST REMAINING CHARACTER COUNT
                          0199
                          0199      ;
                          0199      ; CONVERT TIME
                          0199      ;
                          0199
      54      06 A7   DE  0199          MOVAL   HOUR(R7),R4        ;SET ADDRESS TO STORE HOUR
                 4B   10  019D          BSBB    CONVERT            ;CONVERT HOUR FIELD
                      3A  019F          .BYTE   COLON              ;EXPECTED TERMINATOR
                 48   10  01A0          BSBB    CONVERT            ;CONVERT MINUTE FIELD
                      3A  01A2          .BYTE   COLON              ;EXPECTED TERMINATOR
                 45   10  01A3          BSBB    CONVERT            ;CONVERT SECOND FIELD
                      2E  01A5          .BYTE   PERIOD             ;EXPECTED TERMINATOR
                          01A6
                          01A6                                     ;Convert Hundredth Field
                          01A6                                     ;This must be done differently because
                          01A6                                     ;this is a fractional value.
                          01A6                                     ;Establish max useable digits,
             53  03   D0  01A6          MOVL    #3, R3             ;including the rounding digit.
                 64   B4  01A9          CLRW    (R4)               ;Clear accumulated value.
                 55   B7  01AB  70$:    DECW    R5                 ;Any more characters?
                 2C   19  01AD          BLSS    80$                ;Branch if no more characters.
             51  86   9A  01AF          MOVZBL  (R6)+, R1          ;Get the next character.
             20  51   91  01B2          CMPB    R1, #BLANK         ;A blank marks the end of the field.
                 24   13  01B5          BEQL    80$                ;Branch if at end of the field.
             51  30   C2  01B7          SUBL    #ONE, R1           ;Subtract out character bias.
                 28   19  01BA          BLSS    IVTIME             ;Branch if invalid character.
```

```
       51   09   D1  01BC              CMPL    #NINE-ONE, R1            ;Result value within digit range?
            23   19  01BF              BLSS    IVTIME                   ;Branch if invalid character.
         0B 53   F5  01C1              SOBGTR  R3, 73$                  ;Branch if using this digit directly.
            E5   19  01C4              BLSS    70$                      ;Branch if ignoring this digit.
       51   05   D1  01C6              CMPL    #5, R1                   ;Else digit as the rounding digit.
            E0   14  01C9              BGTR    70$                      ;Branch if rounding has no effect.
            64   B6  01CB              INCW    (R4)                     ;If rounding up, do it.
            DC   11  01CD              BRB     70$                      ;Then loop, but for a regular digit,
       64   0A   A4  01CF      73$:    MULW    #10, (R4)                ;multiply partial result by 10.
            10   1D  01D2              BVS     IVTIME                   ;An overflow means an invalid time.
       64   51   A0  01D4              ADDW    R1, (R4)                 ;Accumulate fracitonal value.
            0B   1D  01D7              BVS     IVTIME                   ;Overflow means invalid time.
            D0   11  01D9              BRB     70$                      ;Loop till end occurs.
                     01DB
            53   D7  01DB      80$:    DECL    R3                       ;Insure that truncated digits are
            3D   15  01DD              BLEQ    CVRTIME                  ;included as zeros in the final
       64   0A   A4  01DF              MULW    #10, (R4)                ;fractional (hundredths) field value.
            F7   11  01E2              BRB     80$                      ;NB: this will always overflow a word
                     01E4                                               ;if the fractional field has a
                     01E4                                               ;resolution greater than thousandths.
                     01E4      ;
                     01E4      ; INVALID SYNTAX OR TIME COMPONENT
                     01E4      ;
                     01E4
 50   0184 BF    3C  01E4      IVTIME: MOVZWL  #SS$_IVTIME,R0           ;SET INVALID TIME
                 04  01E9              RET
                     01EA
                     01EA      ;
                     01EA      ; SUBROUTINE TO CONVERT NUMERIC FIELD TO BINARY
                     01EA      ;
                     01EA
                     01EA      CONVERT:                                 ;CONVERT FIELD
            50   D4  01EA              CLRL    R0                       ;CLEAR ACCUMULATED VALUE
            84   B5  01EC      10$:    TSTW    (R4)+                    ;POINT PAST NEXT FIELD
            55   B7  01EE      11$:    DECW    R5                       ;ANY MORE CHARACTERS?
            2A   19  01F0              BLSS    CVRTIME                  ;IF LSS NO
       51   86   9A  01F2              MOVZBL  (R6)+,R1                 ;GET NEXT CHARACTER
    00 BE   51   91  01F5              CMPB    R1,@(SP)                 ;EXPECTED TERMINATOR?
            1E   13  01F9              BEQL    20$                      ;IF EQL YES
       20   51   91  01FB              CMPB    R1,#BLANK                ;BLANK CHARACTER?
            EE   13  01FE              BEQL    11$                      ;IGNORE BLANKS
       51   30   C2  0200              SUBL    #ONE,R1                  ;SUBTRACT OUT CHARACTER BIAS
            DF   19  0203              BLSS    IVTIME                   ;IF LSS INVALID CHARACTER
       51   09   D1  0205              CMPL    #NINE-ONE,R1             ;RESULT VALUE WITHIN RANGE?
            DA   19  0208              BLSS    IVTIME                   ;IF LSS INVALID CHARACTER
       50   0A   A4  020A              MULW    #10,R0                   ;MULTIPLY PARTIAL RESULT BY 10
            D5   1D  020D              BVS     IVTIME                   ;IF VS INVALID TIME
       50   51   A0  020F              ADDW    R1,R0                    ;ACCUMULATE VALUE
            D0   1D  0212              BVS     IVTIME                   ;IF VS INVALID TIME VALUE
       74   50   B0  0214              MOVW    R0,-(R4)                 ;STORE VALUE
            D3   11  0217              BRB     10$                      ;
            6E   D6  0219      20$:    INCL    (SP)                     ;INCREMENT PAST TERMINATOR
                 05  021B              RSB                              ;
                     021C
                     021C      ;
                     021C      ; CHECK CONVERTED DATE AND TIME VALUES
                     021C      ;
```

```
                                     021C
                                     021C  CVRTIME:                                ;
             04 A7    270F 8F   B1   021C          CMPW    #9999,DAY(R7)           ;DAY WITHIN UPPER LIMIT?
                           C0   1F   0222          BLSSU   IVTIME                  ;IF LSSU NO
                06 A7      18   B1   0224          CMPW    #24,HOUR(R7)            ;HOUR WITHIN LIMITS?
                           BA   1B   0228          BLEQU   IVTIME                  ;IF LEQU NO
                08 A7      3C   B1   022A          CMPW    #60,MINUTE(R7)          ;MINUTE WITHIN LIMITS?
                           B4   1B   022E          BLEQU   IVTIME                  ;IF LEQU NO
                0A A7      3C   B1   0230          CMPW    #60,SECOND(R7)          ;SECOND WITHIN LIMITS?
                           AE   1B   0234          BLEQU   IVTIME                  ;IF LEQU NO
                  55    04 A7   3C   0236          MOVZWL  DAY(R7),R5              ;GET DAY VALUE
                        03 58   E8   023A          BLBS    R8,5$                   ;IF LBS ABSOLUTE TIME
                         0097   31   023D          BRW     40$                     ;
                                     0240
                                     0240  ;
                                     0240  ; CONVERT YEARS TO QUADRICENTURIES, CENTURIES, QUADYEARS, YEARS
                                     0240  ;
                                     0240
                           A2   13   0240  5$:     BEQL    IVTIME                  ;IF EQL INVALID TIME
                        50 67   3C   0242          MOVZWL  YEAR(R7),R0             ;GET YEAR VALUE
                 50    F9BF C0  3E   0245          MOVAW   -1601(R0),R0            ;CALCULATE YEARS PAST 1601
                           98   19   024A          BLSS    IVTIME                  ;IF LSS INVALID TIME
                           51   D4   024C          CLRL    R1                      ;CLEAR HIGH PART OF DIVIDEND
 51    50    50    00000190 8F  7B   024E          EDIV    #400,R0,R0,R1           ;CALCULATE QUADRICENTURIES
                           52   D4   0257          CLRL    R2                      ;CLEAR HIGH PART OF DIVIDEND
 52    51    51    00000064 8F  7B   0259          EDIV    #100,R1,R1,R2           ;CALCULATE CENTURIES
                           53   D4   0262          CLRL    R3                      ;CLEAR HIGH PART OF DIVIDEND
       53    52    52      04   7B   0264          EDIV    #4,R2,R2,R3             ;CALCULATE QUADYEARS AND YEARS
                                     0269
                                     0269  ;
                                     0269  ; CONVERT QUADRICENTURIES, CENTURIES, QUADYEARS, YEARS TO DAYS
                                     0269  ;
                                     0269
                 53    016D 8F  A4   0269          MULW    #365,R3                 ;CALCULATE NUMBER OF DAYS PAST LEAP YEAR
 52    53    52    000005B5 8F  7A   026E          EMUL    #QUADYEARDAYS,R2,R3,R2  ;CALCULATE NUMBER OF QUADYEAR DAYS AND SUM
             51    00008EAC 8F  C4   0277          MULL    #CENTURYDAYS,R1         ;CALCULATE NUMBER OF CENTURY DAYS
 55    51    50    00023AB1 8F  7A   027E          EMUL    #QUADRIDAYS,R0,R1,R5    ;CALCULATE NUMBER OF QUADRIDAYS AND SUM
                           50   D4   0287          CLRL    R0                      ;CLEAR INITIAL LOOP INDEX
                   56   02 A7   3C   0289          MOVZWL  MONTH(R7),R6            ;GET SPECIFIED MONTH VALUE
                     55    52   C0   028D  10$:    ADDL    R2,R5                   ;ACCUMULATE TOTAL DAYS
               52    FD6B CF40  9A   0290          MOVZBL  W^DATETABLE[R0],R2      ;GET NUMBER OF DAYS IN MONTH
                      50   01   D1   0296          CMPL    #1,R0                   ;SECOND MONTH OF YEAR?
                           1E   12   0299          BNEQ    30$                     ;IF NEQ NO
                      53   67   3C   029B          MOVZWL  YEAR(R7),R3             ;GET SPECIFIED YEAR VALUE
                      53   03   D3   029E          BITL    #3,R3                   ;YEAR MULTIPLE OF 4?
                           14   12   02A1          BNEQ    20$                     ;IF NEQ NO
                           54   D4   02A3          CLRL    R4                      ;CLEAR HIGH PART OF DIVIDEND
 54    53    53    00000064 8F  7B   02A5          EDIV    #100,R3,R3,R4           ;CALCULATE CENTURY AND YEAR IN CENTURY
                           54   D5   02AE          TSTL    R4                      ;YEAR MULTIPLE OF 100?
                           07   12   02B0          BNEQ    30$                     ;IF NEQ NO
                      53   03   D3   02B2          BITL    #3,R3                   ;YEAR MULT!PLE OF 400?
                           02   13   02B5          BEQL    30$                     ;IF EQL YES
                           52   D7   02B7  20$:    DECL    R2                      ;REDUCE NUMBER OF DAYS IN MONTH
                   D0 50   56   F2   02B9  30$:    AOBLSS  R6,R0,10$               ;ANY MORE DAYS TO ACCUMULATE?
                 50    01B4 8F  3C   02BD          MOVZWL  #SS$_IVTIME,R0          ;ASSUME INVALID DAY OF MONTH
                   51   04 A7   3C   02C2          MOVZWL  DAY(R7),R1              ;GET SPECIFIED DAY
             55    00016FEC 8F  C2   02C6          SUBL    #TIMOFF2,R5             ;SUBTRACT OUT NUMBER OF DAYS TO 17-NOV-1858
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                   55    51    C0  02CD    541           ADDL    R1,R5                         ;CALCULATE TOTAL NUMBER OF DAYS
                         57    19  02D0    542           BLSS    60$                           ;IF LSS INVALID TIME
                   52    51    D1  02D2    543           CMPL    R1,R2                         ;DAY WITHIN LIMITS?
                         52    1A  02D5    544           BGTRU   60$                           ;IF GTRU NO
                                   02D7    545
                                   02D7    546   ;
                                   02D7    547   ; CONVERT TIME TO TENTHS OF MICROSECONDS
                                   02D7    548   ;
                                   02D7    549
                 50    06 A7    3C  02D7    550 40$:      MOVZWL  HOUR(R7),R0                   ;GET HOUR VALUE
                 51    08 A7    3C  02DB    551           MOVZWL  MINUTE(R7),R1                 ;GET MINUTE VALUE
            50   51    50       7A  02DF    552           EMUL    #60,R0,R1,R0                  ;CONVERT HOURS TO MINUTES AND SUM
                 51    0A A7    3C  02E4    553           MOVZWL  SECOND(R7),R1                 ;GET SECOND VALUE
            50   51    50       7A  02E8    554           EMUL    #60,R0,R1,R0                  ;CONVERT MINUTES TO SECONDS AND SUM
                 51    0C A7    3C  02ED    555           MOVZWL  HUNDREDTH(R7),R1              ;GET HUNDREDTH VALUE
 50   51    50   00000064 8F    7A  02F1    556           EMUL    #100,R0,R1,R0                 ;CONVERT SECONDS TO HUNDREDTHS AND SUM
 50   00    50   000186A0 8F    7A  02FA    557           EMUL    #100000,R0,#0,R0              ;CONVERT TO TENTHS OF MICROSECONDS
                                    0303    558
                                    0303    559   ;
                                    0303    560   ; CONVERT DAYS TO TENTHS OF MICROSECONDS
                                    0303    561   ;
                                    0303    562
 52   00    55   324A9A70 8F    7A  0303    563           EMUL    #843750000,R5,#0,R2           ;MULTIPLY BY 864000000000/1024
                 52    52 0A    79  030C    564           ASHQ    #10,R2,R2                     ;MULTIPLY BY 1024
                                    0310    565
                                    0310    566   ;
                                    0310    567   ; COMBINE RESULTS AND STORE 64-BIT TIME
                                    0310    568   ;
                                    0310    569
                   52    50    C0  0310    570           ADDL    R0,R2                         ;ADD LOW ORDER PARTS
                   53    51    D8  0313    571           ADWC    R1,R3                         ;ADD HIGH ORDER PARTS
                   50    01    3C  0316    572           MOVZWL  #SS$_NORMAL,R0                ;SET NORMAL COMPLETION
                   09    58    E8  0319    573           BLBS    R8,50$                        ;IF LBS ABSOLUTE TIME
                   53    53    CE  031C    574           MNEGL   R3,R3                         ;CONVERT TO DELTA TIME
                   52    52    CE  031F    575           MNEGL   R2,R2                         ;
                   53    00    D9  0322    576           SBWC    #0,R3                         ;
                08 BC    52    7D  0325    577 50$:      MOVQ    R2,@BTIMADR(AP)               ;STORE 64-BIT TIME VALUE
                               04  0329    578 60$:      RET                                   ;
```

```
                          032A          .SBTTL  CONVERT BINARY TIME TO NUMERIC TIME
                          032A     ;+
                          032A     ; EXE$NUMTIM - CONVERT BINARY TIME TO NUMERIC TIME
                          032A     ;
                          032A     ; THIS SERVICE PROVIDES THE CAPABILITY TO CONVERT AN ABSOLUTE OR DELTA TIME
                          032A     ; FROM 64-BIT FORMAT TO INTEGER DATE AND TIME VALUES.
                          032A     ;
                          032A     ; INPUTS:
                          032A     ;
                          032A     ;       NTIMBUF(AP) = ADDRESS OF 7-WORD BUFFER TO RECEIVE CONVERTED DATE AND
                          032A     ;               TIME VALUES.
                          032A     ;       NTIMADR(AP) = ADDRESS OF 64-BIT TIME VALUE. IF ZERO, THEN THE CURRENT
                          032A     ;               SYSTEM TIME IS USED. POSITIVE VALUES ARE INTERPRETED AS
                          032A     ;               ABSOLUTE TIMES AND NEGATIVE VALUES AS DELTA TIMES.
                          032A     ;
                          032A     ; OUTPUTS:
                          032A     ;
                          032A     ;       R0 LOW BIT CLEAR INDICATES FAILURE TO CONVERT TO NUMERIC TIME.
                          032A     ;
                          032A     ;               R0 = SS$_ACCVIO - 64-BIT TIME VALUE CANNOT BE READ BY CALLING
                          032A     ;                       ACCESS MODE OR TIME BUFFER CANNOT BE WRITTEN BY
                          032A     ;                       CALLING ACCESS MODE.
                          032A     ;
                          032A     ;               R0 = SS$_IVTIME - SPECIFIED DELTA TIME IS GREATER THAN 9999
                          032A     ;                       DAYS.
                          032A     ;
                          032A     ;       R0 LOW BIT SET INDICATES SUCCESSFUL COMPLETION.
                          032A     ;
                          032A     ;               R0 = SS$_NORMAL - NORMAL COMPLETION.
                          032A     ;-
                          032A
                          032A     EXE$NUMTIM::                                         ;CONVERT TO NUMERIC TIME
                    00FC  032A             .WORD    ^M<R2,R3,R4,R5,R6,R7>               ;ENTRY MASK
        57   04 AC    D0  032C             MOVL     NTIMBUF(AP),R7                      ;GET ADDRESS OF 7-WORD TIME BUFFER
                          0330             IFNOWRT  #7*2,(R7),10$                       ;CAN TIME BUFFER BE WRITTEN?
          50   01     3C  0336             MOVZWL   #SS$_NORMAL,R0                      ;ASSUME NORMAL COMPLETION
 51   00000000'EF     7D  0339     5$:     MOVQ     EXE$GQ_SYSTIME,R1                   ;ASSUME TIME NOT SPECIFIED
 51   00000000'EF     D1  0340             CMPL     EXE$GQ_SYSTIME,R1                   ;VERIFY THAT THE VALUE ACQUIRED
                F0    12  0347             BNEQ     5$                                  ; WAS NOT BEING MODIFIED DURING
 52   00000004'EF     D1  0349             CMPL     EXE$GQ_SYSTIME+4,R2                 ; THE ACQUISITION. THIS SYNCHS ACCESS BY
                E7    12  0350             BNEQ     5$                                  ; THE SECONDARY IN THE 11/782 SYSTEM.
        53   08 AC    D0  0352             MOVL     NTIMADR(AP),R3                      ;GET ADDRESS OF 64-TIME VALUE
                1C    13  0356             BEQL     20$                                 ;IF EQL NONE SPECIFIED
                          0358             IFNORD   #8,(R3),10$                         ;CAN 64-BIT TIME VALUE BE READ?
          51   63     7D  035E             MOVQ     (R3),R1                             ;GET 64-BIT TIME VALUE
               11     18  0361             BGEQ     20$                                 ;IF GEQ ABSOLUTE TIME
          52   52     CE  0363             MNEGL    R2,R2                               ;NEGATE DELTA TIME VALUE
          51   51     CE  0366             MNEGL    R1,R1                               ;
          52   00     D9  0369             SBWC     #0,R2                               ;
       04 50   00     E4  036C             BBSC     #0,R0,20$                           ;INDICATE DELTA TIME VALUE
          50   0C     3C  0370     10$:    MOVZWL   #SS$_ACCVIO,R0                      ;SET ACCESS VIOLATION
                      04  0373             RET                                          ;
                          0374
                          0374     ;
                          0374     ; R1 AND R2 CONTAIN 64-BIT ABSOLUTE TIME VALUE IN UNITS OF TENTHS OF MICRO-
                          0374     ; SECONDS. CALCULATE DAYS PAST BASE TIME AND FRACTION OF DAY BY DIVIDING
                          0374     ; BY 864000000000 WHICH IS THE NUMBER OF TENTHS OF MICROSECONDS IN A DAY.
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                                        0374  ; THE DIVISION IS PERFORMED IN THREE STEPS TO INSURE BOTH QUOTIENT AND
                                        0374  ; REMAINDER STAY WITHIN 32 BITS.
                                        0374  ;
                                        0374  ; CALCULATE DAYS BY DIVIDING BY 1024 AND THEN 843750000. QUOTIENT IS DAYS
                                        0374  ; AND REMAINDER IS FRACTION OF DAY.
                                        0374  ;
                                        0374
              54   51   0A   00    EF   0374  20$:    EXTZV   #0,#10,R1,R4              ;SAVE REMAINDER FROM NEXT DIVIDE
                   51   51   F6 8F 79   0379          ASHQ    #-10,R1,R1                ;DIVIDE BY 1024
   52   51   51    324A9A70 8F     7B   037E          EDIV    #843750000,R1,R1,R2       ;CALCULATE DAYS AND FRACTION OF DAY
                                        0387
                                        0387  ;
                                        0387  ; R1 CONTAINS DAYS PAST BASE TIME, R2 PLUS R4 CONTAIN FRACTION OF DAY.
                                        0387  ; R2 CONTAINS PART OF FRACTION IN UNITS OF 864000000000/1024 AND
                                        0387  ; R4 CONTAINS REMAINDER IN UNITS OF TENTHS OF MICROSECONDS.
                                        0387  ;
                                        0387  ; CALCULATE FRACTION OF DAY IN HUNDREDTHS OF SECONDS BY DIVIDING BY
                                        0387  ; 100000 WHICH IS THE NUMBER OF TENTHS OF MICROSECONDS IN A HUNDRETH
                                        0387  ; OF A SECOND.
                                        0387  ;
                                        0387
                             53    D4   0387          CLRL    R3                        ;CLEAR HIGH PART OF DIVIDEND
                   52   52   0A    79   0389          ASHQ    #10,R2,R2                 ;CONVERT BACK TO TENTHS OF MICROSECONDS
                        52   54    C8   038D          BISL    R4,R2                     ;ADD REMAINDER BACK
   52   55   52    000186A0 8F     7B   0390          EDIV    #100000,R2,R5,R2          ;CALCULATE FRACTION OF DAY IN HUNDREDTHS
                                        0399
                                        0399  ;
                                        0399  ; R1 CONTAINS DAYS PAST THE BASE TIME AND R5 CONTAINS THE FRACTION OF DAY
                                        0399  ; IN HUNDREDTHS OF A SECOND.
                                        0399  ;
                                        0399
                   7E 50     00    E3   0399          BBCS    #0,R0,70$                 ;IF CLR, DELTA TIME SPECIFIED
                                        039D
                                        039D  ;
                                        039D  ; ADD TIME OFFSET SO THAT DAY IS RELATIVE TO 1-JAN-1501.
                                        039D  ;
                                        039D
             51    0001FE98 8F     C0   039D          ADDL    #TIMOFF1,R1               ;ADD TIME OFFSET
                                        03A4
                                        03A4  ;
                                        03A4  ; CALCULATE NUMBER OF QUADRICENTURIES THAT HAVE PAST SINCE 1501.
                                        03A4  ;
                                        03A4
                             52    D4   03A4          CLRL    R2                        ;CLEAR HIGH PART OF DIVIDEND
   52   51   51    00023AB1 8F     7B   03A6          EDIV    #QUADRIDAYS,R1,R1,R2      ;CALCULATE NUMBER OF QUADRICENTURIES
                                        03AF
                                        03AF  ;
                                        03AF  ; R1 CONTAINS THE NUMBER OF QUADRICENTURIES AND R2 CONTAINS THE NUMBER OF
                                        03AF  ; DAYS INTO THE NEXT QUADRICENTURY. CALCULATE THE NUMBER OF CENTURIES BY
                                        03AF  ; CONVERTING TO QUARTER DAYS INTO NEXT QUADRICENTURY AND THEN DIVIDING BY
                                        03AF  ; THE AVERAGE NUMBER OF QUARTER DAYS IN A CENTURY.
                                        03AF  ;
                                        03AF
                        52   04    C4   03AF          MULL    #4,R2                     ;CALCULATE NUMBER OF QUARTER DAYS
                             53    D4   03B2          CLRL    R3                        ;CLEAR HIGH PART OF DIVIDEND
   53   52   52    00023AB1 8F     7B   03B4          EDIV    #QDAYSPCENT,R2,R2,R3      ;CALCULATE NUMBER OF CENTURIES
                                        03BD
```

```
                                03BD  ;
                                03BD  ; R2 CONTAINS THE NUMBER OF CENTURIES AND R3 CONTAINS THE NUMBER OF QUARTER
                                03BD  ; DAYS INTO THE NEXT CENTURY.
                                03BD  ;
                                03BD  ; CALCULATE YEARS BY DISCARDING ANY FRACTION OF A DAY, ADDING 3/4'THS OF A
                                03BD  ; DAY, AND DIVIDING BY THE AVERAGE NUMBER OF DAYS IN A YEAR. THE LEAP DAY
                                03BD  ; OF EACH FOUR YEAR CYCLE IS FORCED INTO THE FOURTH YEAR.
                                03BD  ;
                                03BD
                      54    D4  03BD          CLRL    R4                      ;CLEAR HIGH PART OF DIVIDEND
                  53  03    C8  03BF          BISL    #3,R3                   ;TRUNCATE FRACTION AND ADD 3/4'THS OF DAY
  54   53   53  000005B5 8F 7B  03C2          EDIV    #QDAYSPYEAR,R3,R3,R4    ;CALCULATE NUMBER OF YEARS
                  54  04    C6  03CB          DIVL    #4,R4                   ;CALCULATE NUMBER OF DAYS MINUS ONE
                      54    D6  03CE          INCL    R4                      ;CONVERT TO ACTUAL JULIAN DAY OF YEAR
                                03D0
                                03D0  ;
                                03D0  ; R1 CONTAINS NUMBER OF QUADRICENTURIES.
                                03D0  ; R2 CONTAINS NUMBER OF CENTURIES.
                                03D0  ; R3 CONTAINS NUMBER OF YEARS.
                                03D0  ; R4 CONTAINS JULIAN DAY OF YEAR.
                                03D0  ;
                                03D0  ; CALCULATE ACTUAL YEAR.
                                03D0  ;
                                03D0
                51  6241    DE  03D0          MOVAL   (R2)[R1],R1             ;COMBINE CENTURIES AND QUADRICENTURIES
                  51  32    C4  03D4          MULL    #50,R1                  ;CALCULATE NUMBER OF DOUBLE CENTURIES
          51  05DD C341     3E  03D7          MOVAW   1501(R3)[R1],R1         ;CALCULATE ACTUAL YEAR
                  87  51    B0  03DD          MOVW    R1,(R7)+                ;STORE YEAR
                                03E0
                                03E0  ;
                                03E0  ; TEST FOR NONLEAP YEAR AND BIAS DAY IF AFTER 28-FEB.
                                03E0  ;
                                03E0
                  51  03    D3  03E0          BITL    #3,R1                   ;YEAR MULTIPLE OF 4?
                      14    12  03E3          BNEQ    30$                     ;IF NEQ NO
                      52    D4  03E5          CLRL    R2                      ;CLEAR HIGH PART OF DIVIDEND
  52   51   51  00000064 8F 7B  03E7          EDIV    #100,R1,R1,R2           ;CALCULATE CENTURY AND YEAR IN CENTURY
                      52    D5  03F0          TSTL    R2                      ;YEAR MULTIPLE OF 100?
                      0C    12  03F2          BNEQ    40$                     ;IF NEQ NO
                  51  03    D3  03F4          BITL    #3,R1                   ;YEAR MULTIPLE OF 400?
                      07    13  03F7          BEQL    40$                     ;IF EQL YES
                  54  3B    D1  03F9  30$:    CMPL    #31+28,R4               ;AFTER 28-FEB?
                      02    18  03FC          BGEQ    40$                     ;IF GEQ NO
                      54    D6  03FE          INCL    R4                      ;ADJUST FOR TABLE BIAS
                  51  01    D0  0400  40$:    MOVL    #1,R1                   ;INITIALIZE MONTH
          52  FBF7 CF41     9A  0403  50$:    MOVZBL  W^DATETABLE-1[R1],R2    ;GET NUMBER OF DAYS IN MONTH
                  54  52    C2  0409          SUBL    R2,R4                   ;SUBTRACT FROM JULIAN DAY
                      04    15  040C          BLEQ    60$                     ;IF LEQ CORRECT MONTH FOUND
               F1 51  0C    F3  040E          AOBLEQ  #12,R1,50$              ;LOOP THROUGH ALL MONTHS
                  87  51    B0  0412  60$:    MOVW    R1,(R7)+                ;STORE MONTH
              87  54  52    A1  0415          ADDW3   R2,R4,(R7)+             ;STORE DAY
                      14    11  0419          BRB     80$                     ;
                                041B
                                041B  ;
                                041B  ; DELTA TIME SPECIFIED - STORE RELATIVE DAY
                                041B  ;
                                041B
```

```
                    87   D4  041B   70$:    CLRL    (R7)+                   ;CLEAR YEAR AND MONTH
                87  51   B0  041D           MOVW    R1,(R7)+                ;STORE DAY
  51     00002710 8F     D1  0420           CMPL    #10000,R1               ;RELATIVE DAY WITHIN LIMITS?
                    06   1A  0427           BGTRU   80$                     ;IF GTRU YES
       50    0184 8F     3C  0429           MOVZWL  #SS$_IVTIME,R0          ;SET INVALID TIME
                         04  042E           RET                             ;
                             042F
                             042F       ;
                             042F       ; R5 CONTAINS FRACTION OF DAY IN HUNDREDTHS OF SECONDS.
                             042F       ;
                             042F       ; CALCULATE HOUR, MINUTE, SECOND, AND HUNDREDTH OF SECOND.
                             042F       ;
                             042F
                57  08   C0  042F   80$:    ADDL    #8,R7                   ;POINT TWO BYTES PAST END OF BUFFER
                    51   D4  0432           CLRL    R1                      ;CLEAR LOOP INDEX
     52    FC03 CF41     9A  0434   90$:    MOVZBL  W^TIMETABLE[R1],R2      ;GET NEXT UNIT DIVISOR
                    56   D4  043A           CLRL    R6                      ;CLEAR HIGH PART OF DIVIDEND
  56    55      55  52   7B  043C           EDIV    R2,R5,R5,R6             ;CALCULATE NEXT PART
                77  56   B0  0441           MOVW    R6,-(R7)                ;STORE NEXT PART
           EC   51  02   F3  0444           AOBLEQ  #2,R1,90$               ;LOOP FOR HUNDREDTHS, SECONDS, AND MINUTES
                77  55   B0  0448           MOVW    R5,-(R7)                ;STORE HOUR
                         04  044B           RET                             ;
                             044C
                             044C           .END
```

```
$$T2                               = 00000007
ACVTFLG                            = 00000010
ATIMADR                            = 0000000C
ATIMBUF                            = 00000008
ATIMLEN                            = 00000004
BLANK                              = 00000020
BTIMADR                            = 00000008
BTIMBUF                            = 00000004
CENTURYDAYS                        = 00008EAC
COLON                              = 0000003A
CONVERT                              000001EA R       02
CVRTIME                              0000021C R       02
DATE                                 0000003F R       02
DATETABLE                            00000000 R       02
DAY                                = 00000004
DELTA                                0000004D R       02
EXE$ASCTIM                           00000065 RG      02
EXE$BINTIM                           00000106 RG      02
EXE$GQ_SYSTIME                       ********   X     02
EXE$NUMTIM                           0000032A RG      02
HOUR                               = 00000006
HUNDREDTH                          = 0000000C
HYPHEN                             = 0000002D
IVTIME                               000001E4 R       02
MINUTE                             = 00000008
MONTH                              = 00000002
MONTHTAB                             0000000C R       02
NINE                               = 00000039
NTIMADR                            = 00000008
NTIMBUF                            = 00000004
ONE                                = 00000030
PERIOD                             = 0000002E
QDAYSPCENT                         = 00023AB1
QDAYSPYEAR                         = 000005B5
QUADRIDAYS                         = 00023AB1
QUADYEARDAYS                       = 000005B5
SECOND                             = 0000000A
SS$_ACCVIO                         = 0000000C
SS$_IVTIME                         = 00000184
SS$_NORMAL                         = 00000001
SYS$FAO                              ********   X     02
SYS$NUMTIM                           ********  GX     02
TIME                                 00000052 R       02
TIMETABLE                            0000003C R       02
TIMOFF1                            = 0001FE98
TIMOFF2                            = 00016FEC
YEAR                               = 00000000


                                              +----------------+
                                              ! Psect synopsis !
                                              +----------------+

PSECT name                        Allocation           PSECT No.  Attributes
----------                        ----------           ---------  ----------
.  ABS  .                         00000000  (     0.)  00 (   0.)  NOPIC    USR    CON    ABS    LCL NOSHR NOEXE NORD   NOWRT NOVEC BYTE
$ABS$                             00000000  (     0.)  01 (   1.)  NOPIC    USR    CON    ABS    LCL NOSHR   EXE   RD     WRT NOVEC BYTE
Y$EXEPAGED                        0000044C  (  1100.)  02 (   2.)  NOPIC    USR    CON    REL    LCL NOSHR   EXE   RD     WRT NOVEC BYTE
```

```
                                            +--------------------------+
                                            ! Performance indicators !
                                            +--------------------------+

Phase                    Page faults    CPU Time        Elapsed Time
-----                    -----------    --------        ------------
Initialization                   29    00:00:00.08     00:00:01.01
Command processing              110    00:00:00.58     00:00:04.22
Pass 1                          232    00:00:05.96     00:00:20.69
Symbol table sort                 0    00:00:00.68     00:00:02.58
Pass 2                          143    00:00:01.89     00:00:05.95
Symbol table output               8    00:00:00.07     00:00:00.32
Psect synopsis output             1    00:00:00.02     00:00:00.02
Cross-reference output            0    00:00:00.00     00:00:00.00
Assembler run totals            525    00:00:09.28     00:00:34.79

The working set limit was 1500 pages.
34724 bytes (68 pages) of virtual memory were used to buffer the intermediate code.
There were 30 pages of symbol table space allocated to hold 451 non-local and 39 local symbols.
774 source lines were read in Pass 1, producing 15 object records in Pass 2.
14 pages of virtual memory were used to define 12 macros.

                                           +----------------------------+
                                           ! Macro library statistics !
                                           +----------------------------+

Macro library name                         Macros defined
------------------                         --------------
_$255$DUA28:[SYS.OBJ]LIB.MLB;1                        2
_$255$DUA28:[SYSLIB]STARLET.MLB;2                     7
TOTALS (all libraries)                                9

505 GETS were required to define 9 macros.

There were no errors, warnings or information messages.

MACRO/LIS=LIS$:SYSCVRTIM/OBJ=OBJ$:SYSCVRTIM MSRC$:SYSCVRTIM/UPDATE=(ENH$:SYSCVRTIM)+EXECML$/LIB
```

0383 AH-BT13A-SE
VAX/VMS V4.0

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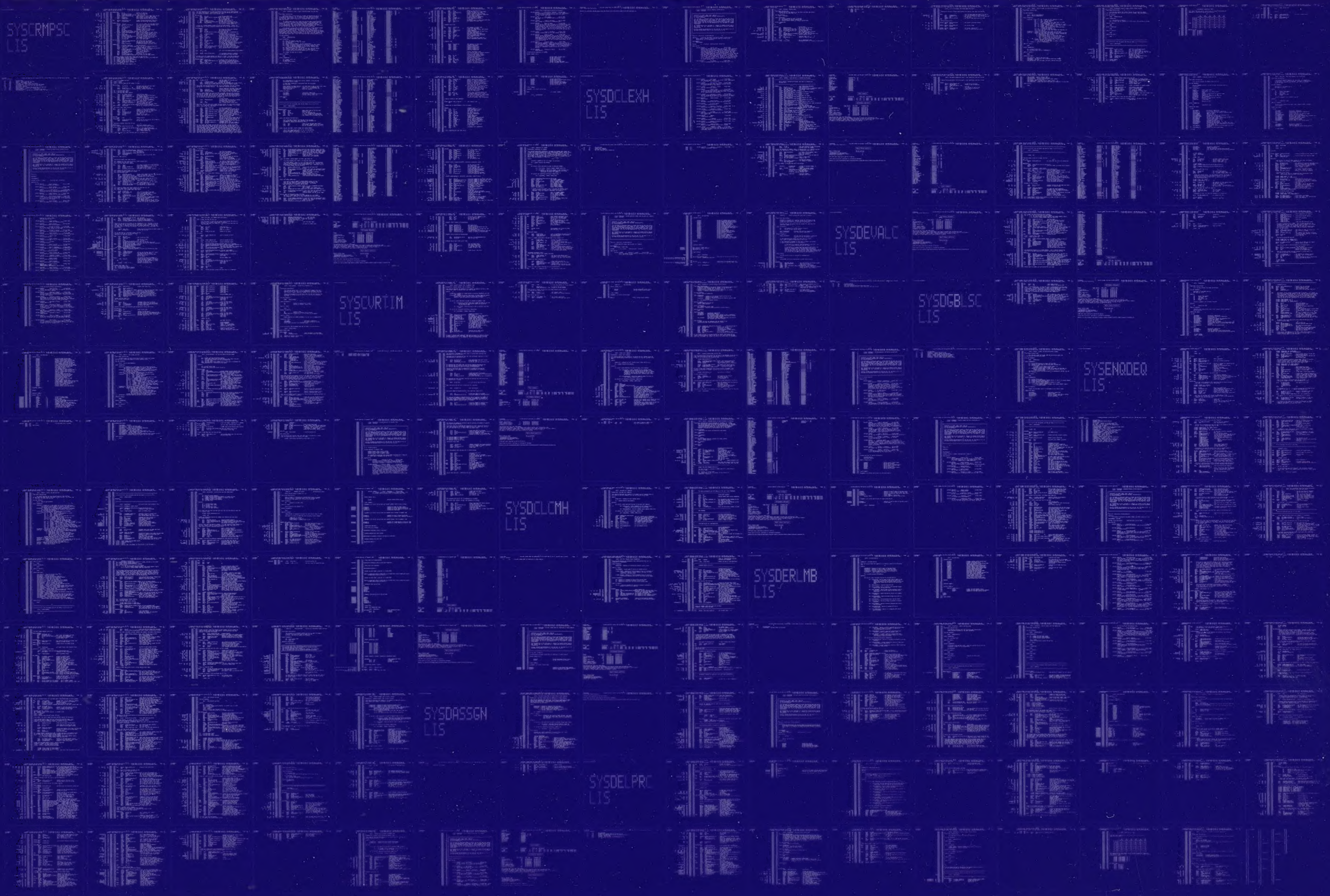
SYSCRMPSC
LIS

SYSDCLEXH
LIS

SYSDEVALC
LIS

SYSCVRTIM
LIS

SYSDGBLSC
LIS

SYSENQDEQ
LIS

SYSDCLCMH
LIS

SYSDERLMB
LIS

SYSDASSGN
LIS

SYSDELPRC
LIS